

WHAT IS CLAIMED IS:

1. A semiconductor device comprising:

a first transistor including a first substrate formed of a wide bandgap semiconductor and containing an impurity of a first conductive type, a first electrode formed in a principal surface side of the first substrate, a second electrode formed in a back surface side of the first substrate and a first control electrode formed in the principal surface side of the first substrate; and

a second transistor formed of a wide bandgap semiconductor, including a second substrate containing an impurity of a first conductive type, a third electrode formed in a principal surface side of the second substrate and electrically connected to the first electrode, a fourth electrode formed in a back surface side of the second substrate, and a second control electrode formed in the principal side of the second substrate, and having the same electric properties as those of the first transistor

wherein the first transistor and the second transistor are stacked so that the respective principal surface sides of the first substrate and the second substrate face each other.

2. The semiconductor device of claim 1, which is operable as a bi-directional device, and

wherein the first control electrode and the second control electrode are electrodes for controlling a current flowing from the second electrode to the fourth electrode or a current flowing from the fourth electrode to the second electrode.

3. The semiconductor device of claim 1, wherein each of the first transistor and the second transistor is a vertical-type MISFET,

wherein each of the first electrode and the third electrode is a source electrode,
wherein each of the second electrode and the fourth electrode is a drain electrode,
and
wherein each of the first control electrode and the second control electrode is a gate
5 electrode.

4. The semiconductor device of claim 1, wherein each of the first substrate and the
second substrate is formed of silicon carbide.

10 5. The semiconductor device of claim 1, further comprising:
a first conductive plate interposed between the first transistor and second transistor,
having protruding part, and connected to the first electrode and the third electrode; and
a second conductive plate interposed between the first transistor and second
transistor, having protruding part, connected to the first control electrode and the second
15 control electrode, and electrically isolated from the first conductive plate.

6. The semiconductor device of claim 1, further comprising:
a first metal plate adhered to the back surface of the first substrate; and
a second metal plate adhered to the back surface of the second substrate.

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7. A sustaining circuit comprising a bi-directional device which is connectable to a
plasma display panel and includes an output section for outputting a pulse voltage for
driving the panel and connected to the output section
wherein the bi-directional device includes:

25 a first transistor including a first substrate formed of a wide bandgap

semiconductor and containing an impurity of a first conductive type, a first electrode formed in a principal surface side of the first substrate, a second electrode formed in a back surface side of the first substrate and a first control electrode formed in the principal surface side of the first substrate; and

5 a second transistor formed of a wide bandgap semiconductor, including a second substrate containing an impurity of a first conductive type, a third electrode formed in a principal surface side of the second substrate and electrically connected to the first electrode, a fourth electrode formed in a back surface side of the second substrate, and a second control electrode formed in the principal side of the second
10 substrate, and having the same electric properties as those of the first transistor, and wherein the first transistor and the second transistor are stacked so that the respective principal surface sides of the first substrate and the second substrate face each other.

15 8. The sustaining circuit of claim 7, further comprising:

a capacitor having a terminal grounded and another terminal connected to the bi-directional device;

an inductance provided between the bi-directional device and the output section;

a first switch provided between a first power supply and the output section; and

20 a second switch provided between a second power supply for supplying a lower voltage than that of the first power supply and the output section.

9. The sustaining circuit of claim 8, wherein each of the first transistor and the second transistor is a vertical-type MISFET,

25 wherein each of the first electrode and the third electrode is a source electrode,

wherein each of the second electrode and the fourth electrode is a drain electrode,
and

wherein each of the first control electrode and second control electrode is a gate
electrode.

5